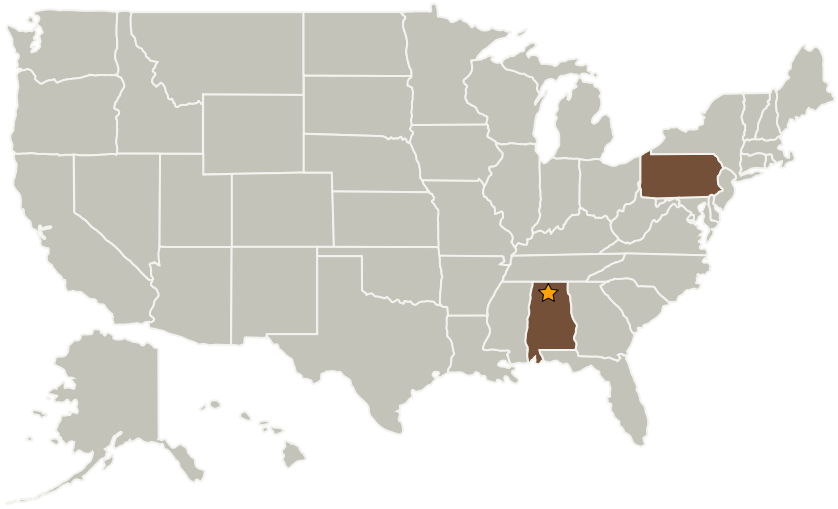
# Base Flow Model Validation, Phase I

Completed Technology Project (2005 - 2006)

## Project Introduction

The innovation is the systematic "building-block" validation of CFD/turbulence models employing a GUI driven CFD code (RPFM) and existing as well as new data sets to be generated in this proposed program. Unified ke and algebraic stress (EASM) turbulence models, shown to adequately simulate fundamental high-speed jet data sets and now being validated with PIV data sets in a NASA Glenn program, will be used. These jet turbulence models will be improved to provide agreement with base region data for cold air data sets. Hot jet base region data sets are not readily to evaluate Prandtl number models affecting base heating. Inadequacies pose major issues with regard to analyzing base regions of rocket motors. A key innovation is to obtain high speed, hot jet base region data sets in the new, U.Miss/Oxford 12" quiet tunnel facility using advanced diagnostic techniques, extending the hot, supersonic jet data of Seiner. In Phase I, consistent modeling of cold flow base region data will be achieved, and, the hot jet base region problem will be initiated. This innovation fills a major gap at NASA improving upon base region simulation capabilities required for launcher design aerothermal predictions.

## Primary U.S. Work Locations and Key Partners

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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Marshall Space Flight Center (MSFC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Marshall Space Flight Center(MSFC) | Lead Organization | NASA Center | Huntsville, Alabama |
| CRAFT Tech - Combustion Research and Flow Technology | Supporting Organization | Industry | Pipersville, Pennsylvania |

| Primary U.S. Work Locations | |
|---|---|
| Alabama | Pennsylvania |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.2 Intelligent Data Understanding